RECEIVED

SEP 2 4 2003

TECH CENTER 1600/2900

1600

RAW SEQUENCE LISTING
PATENT APPLICATION: **US/09/721,212**

DATE: 09/22/2003
TIME: 10:43:44

Input Set : **A:\A-451K REV 091003-54.txt**
Output Set: **N:\CRF4\09222003\I721212.raw**

```
 3 <110> APPLICANT: BOYLE, WILLIAM
 5 <120> TITLE OF INVENTION: OSTEOPROTEGERIN BINDING PROTEINS AND RECEPTORS
 7 <130> FILE REFERENCE: A-451K REV 09-10-03 54SEQ
 9 <140> CURRENT APPLICATION NUMBER: US 09/721,212
10 <141> CURRENT FILING DATE: 2000-11-21
12 <150> PRIOR APPLICATION NUMBER: US 09/052,521
13 <151> PRIOR FILING DATE: 1998-03-30
15 <150> PRIOR APPLICATION NUMBER: US 08/880,855
16 <151> PRIOR FILING DATE: 1997-06-23
18 <150> PRIOR APPLICATION NUMBER: US 08/842,842
19 <151> PRIOR FILING DATE: 1997-04-16
21 <160> NUMBER OF SEQ ID NOS: 54
23 <170> SOFTWARE: PatentIn version 3.1
25 <210> SEQ ID NO: 1
26 <211> LENGTH: 2295
27 <212> TYPE: DNA
28 <213> ORGANISM: Mus musculus
30 <220> FEATURE:
31 <221> NAME/KEY: CDS
32 <222> LOCATION: (158)..(1105)
33 <223> OTHER INFORMATION:
```

ENTERED

```
W--> 36 <400> 1
     37 gagctcggat ccactactcg acccacgcgt ccggccagga cctctgtgaa ccggtcgggg      60
     39 cgggggccgc ctggccggga gtctgctcgg cggtgggtgg ccgaggaagg gagagaacga     120
     41 tcgcggagca gggcgcccga actccgggcg ccgcgcc atg cgc cgg gcc agc cga     175
     42                                             Met Arg Arg Ala Ser Arg
     43                                             1               5
     45 gac tac ggc aag tac ctg cgc agc tcg gag gag atg ggc agc ggc ccc     223
     46 Asp Tyr Gly Lys Tyr Leu Arg Ser Ser Glu Glu Met Gly Ser Gly Pro
     47             10                  15                  20
     49 ggc gtc cca cac gag ggt ccg ctg cac ccc gcg cct tct gca ccg gct     271
     50 Gly Val Pro His Glu Gly Pro Leu His Pro Ala Pro Ser Ala Pro Ala
     51         25                  30                  35
     53 ccg gcg ccg cca ccc gcc gcc tcc cgc tcc atg ttc ctg gcc ctc ctg     319
     54 Pro Ala Pro Pro Pro Ala Ala Ser Arg Ser Met Phe Leu Ala Leu Leu
     55     40                  45                  50
     57 ggg ctg gga ctg ggc cag gtg gtc tgc agc atc gct ctg ttc ctg tac     367
     58 Gly Leu Gly Leu Gly Gln Val Val Cys Ser Ile Ala Leu Phe Leu Tyr
     59 55                  60                  65                  70
     61 ttt cga gcg cag atg gat cct aac aga ata tca gaa gac agc act cac     415
     62 Phe Arg Ala Gln Met Asp Pro Asn Arg Ile Ser Glu Asp Ser Thr His
     63                 75                  80                  85
     65 tgc ttt tat aga atc ctg aga ctc cat gaa aac gca ggt ttg cag gac     463
```

RAW SEQUENCE LISTING   DATE: 09/22/2003
PATENT APPLICATION: **US/09/721,212**   TIME: 10:43:44

Input Set : **A:\A-451K REV 091003-54.txt**
Output Set: **N:\CRF4\09222003\I721212.raw**

```
66 Cys Phe Tyr Arg Ile Leu Arg Leu His Glu Asn Ala Gly Leu Gln Asp
67              90             '  95                  100
69 tcg act ctg gag agt gaa gac aca cta cct gac tcc tgc agg agg atg      511
70 Ser Thr Leu Glu Ser Glu Asp Thr Leu Pro Asp Ser Cys Arg Arg Met
71         105                 110                 115
73 aaa caa gcc ttt cag ggg gcc gtg cag aag gaa ctg caa cac att gtg      559
74 Lys Gln Ala Phe Gln Gly Ala Val Gln Lys Glu Leu Gln His Ile Val
75     120        .          125                 130
77 ggg cca cag cgc ttc tca gga gct cca gct atg atg gaa ggc tca tgg      607
78 Gly Pro Gln Arg Phe Ser Gly Ala Pro Ala Met Met Glu Gly Ser Trp
79 135                 140                 145                 150
81 ttg gat gtg gcc cag cga ggc aag cct gag gcc cag cca ttt gca cac      655
82 Leu Asp Val Ala Gln Arg Gly Lys Pro Glu Ala Gln Pro Phe Ala His
83                 155                 160                 165
85 ctc acc atc aat gct gcc agc atc cca tcg ggt tcc cat aaa gtc act      703
86 Leu Thr Ile Asn Ala Ala Ser Ile Pro Ser Gly Ser His Lys Val Thr
87             170                 175                 180
89 ctg tcc tct tgg tac cac gat cga ggc tgg gcc aag atc tct aac atg      751
90 Leu Ser Ser Trp Tyr His Asp Arg Gly Trp Ala Lys Ile Ser Asn Met
91         185                 190                 195        .
93 acg tta agc aac gga aaa cta agg gtt aac caa gat ggc ttc tat tac      799
94 Thr Leu Ser Asn Gly Lys Leu Arg Val Asn Gln Asp Gly Phe Tyr Tyr
95     200                 205                 210  .
97 ctg tac gcc aac att tgc ttt cgg cat cat gaa aca tcg gga agc gta      847
98 Leu Tyr Ala Asn Ile Cys Phe Arg His His Glu Thr Ser Gly Ser Val
99 215                 220                 225                 230
101 cct aca gac tat ctt cag ctg atg gtg tat gtc gtt aaa acc agc atc     895
102 Pro Thr Asp Tyr Leu Gln Leu Met Val Tyr Val Val Lys Thr Ser Ile
103                 235         .        240                 245
105 aaa atc cca agt tct cat aac ctg atg aaa gga ggg agc acg aaa aac     943
106 Lys Ile Pro Ser Ser His Asn Leu Met Lys Gly Gly Ser Thr Lys Asn
107             250         .        255        .        260
109 tgg tcg ggc aat tct gaa ttc cac ttt tat tcc ata aat gtt ggg gga     991
110 Trp Ser Gly Asn Ser Glu Phe His Phe Tyr Ser Ile Asn Val Gly Gly
111         265         '        270                 275
113 ttt ttc aag ctc cga gct ggt gaa gaa att agc att cag gtg tcc aac     1039
114 Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile Ser Ile Gln Val Ser Asn
115     280         '        285                 290
117 cct tcc ctg ctg gat ccg gat caa gat gcg acg tac ttt ggg gct ttc     1087
118 Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala Thr Tyr Phe Gly Ala Phe
119 295                 300         '        305                 310
121 aaa gtt cag gac ata gac tgagactcat ttcgtggaac attagcatgg          1135
122 Lys Val Gln Asp Ile Asp
123                 315
125 atgtcctaga tgtttggaaa cttcttaaaa aatggatgat gtctatacat gtgtaagact  1195
127 actaagagac atggcccacg gtgtatgaaa ctcacagccc tctctcttga gcctgtacag  1255
129 gttgtgtata tgtaaagtcc ataggtgatg ttagattcat ggtgattaca caacggtttt  1315
131 acaattttgt aatgatttcc tagaattgaa ccagattggg agaggtattc cgatgcttat  1375
133 gaaaaactta cacgtgagct atggaagggg gtcacagtct ctgggtctaa cccctggaca  1435
```

RAW SEQUENCE LISTING
PATENT APPLICATION: **US/09/721,212**

DATE: 09/22/2003
TIME: 10:43:44

Input Set : **A:\A-451K REV 091003-54.txt**
Output Set: **N:\CRF4\09222003\I721212.raw**

```
135  tgtgccactg agaaccttga aattaagagg atgccatgtc attgcaaaga aatgatagtg  1495
137  tgaagggtta agttcttttg aattgttaca ttgcgctggg acctgcaaat aagttctttt  1555
139  tttctaatga ggagagaaaa atatatgtat ttttatataa tgtctaaagt tatatttcag  1615
141  gtgtaatgtt ttctgtgcaa agttttgtaa attatatttg tgctatagta tttgattcaa  1675
143  aatatttaaa aatgtctcac tgttgacata tttaatgttt taaatgtaca gatgtattta  1735
145  actggtgcac tttgtaattc ccctgaaggt actcgtagct aaggggggcag aatactgttt  1795
147  ctggtgacca catgtagttt atttctttat tcttttttaac ttaatagagt cttcagactt  1855
149  gtcaaaacta tgcaagcaaa ataaataaat aaaaataaaa tgaatacctt gaataataag  1915
151  taggatgttg gtcaccaggt gcctttcaaa tttagaagct aattgacttt aggagctgac  1975
153  atagccaaaa aggatacata ataggctact gaaatctgtc aggagtattt atgcaattat  2035
155  tgaacaggtg tcttttttta caagagctac aaattgtaaa ttttgtttct tttttttccc  2095
157  atagaaaatg tactatagtt tatcagccaa aaaacaatcc acttttaat ttagtgaaag  2155
159  ttattttatt atactgtaca ataaaagcat tgtctctgaa tgttaatttt ttggtacaaa  2215
161  aaataaattt gtacgaaaac ctgaaaaaaa aaaaaaaaaa aaaaaaagg gcggccgctc  2275
163  tagagggccc tattctatag                                            2295
166  <210> SEQ ID NO: 2
167  <211> LENGTH: 316
168  <212> TYPE: PRT
169  <213> ORGANISM: Mus musculus
171  <400> SEQUENCE: 2
173  Met Arg Arg Ala Ser Arg Asp Tyr Gly Lys Tyr Leu Arg Ser Ser Glu
174  1               5                   10                  15
177  Glu Met Gly Ser Gly Pro Gly Val Pro His Glu Gly Pro Leu His Pro
178              20                  25                  30
181  Ala Pro Ser Ala Pro Ala Pro Ala Pro Pro Pro Ala Ala Ser Arg Ser
182          35                  40                  45
185  Met Phe Leu Ala Leu Leu Gly Leu Gly Leu Gly Gln Val Val Cys Ser
186      50                  55                  60
189  Ile Ala Leu Phe Leu Tyr Phe Arg Ala Gln Met Asp Pro Asn Arg Ile
190  65                  70                  75                  80
193  Ser Glu Asp Ser Thr His Cys Phe Tyr Arg Ile Leu Arg Leu His Glu
194                  85                  90                  95
197  Asn Ala Gly Leu Gln Asp Ser Thr Leu Glu Ser Glu Asp Thr Leu Pro
198              100                 105                 110
201  Asp Ser Cys Arg Arg Met Lys Gln Ala Phe Gln Gly Ala Val Gln Lys
202          115                 120                 125
205  Glu Leu Gln His Ile Val Gly Pro Gln Arg Phe Ser Gly Ala Pro Ala
206      130                 135                 140
209  Met Met Glu Gly Ser Trp Leu Asp Val Ala Gln Arg Gly Lys Pro Glu
210  145                 150                 155                 160
213  Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro Ser
214              165                 170                 175
217  Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly Trp
218              180                 185                 190
221  Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val Asn
222          195                 200                 205
225  Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His His
226      210                 215                 220
229  Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val Tyr
```

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/721,212

DATE: 09/22/2003
TIME: 10:43:44

Input Set : A:\A-451K REV 091003-54.txt
Output Set: N:\CRF4\09222003\I721212.raw

```
230 225                  230                  235                  240
233 Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met Lys
234                  245                  250                  255
237 Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe Tyr
238                  260                  265                  270
241 Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile
242             275                  280                  285
245 Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala
246       290                  295                  300
249 Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
250 305                  310                  315
253 <210> SEQ ID NO: 3
254 <211> LENGTH: 2271
255 <212> TYPE: DNA
256 <213> ORGANISM: Homo sapiens
258 <220> FEATURE:
259 <221> NAME/KEY: CDS
260 <222> LOCATION: (185)..(1135)
261 <223> OTHER INFORMATION:
```

W--> 264 <400> 3
```
265 aagcttggta ccgagctcgg atccactact cgacccacgc gtccgcgcgc cccaggagcc      60
267 aaagccgggc tccaagtcgg cgccccacgt cgaggctccg ccgcagcctc cggagttggc     120
269 cgcagacaag aaggggaggg agcgggagag ggaggagagc tccgaagcga gagggccgag     180
271 cgcc atg cgc cgc gcc agc aga gac tac acc aag tac ctg cgt ggc tcg     229
272      Met Arg Arg Ala Ser Arg Asp Tyr Thr Lys Tyr Leu Arg Gly Ser
273       1               5                  10                  15
275 gag gag atg ggc ggc ggc ccc gga gcc ccg cac gag ggc ccc ctg cac     277
276 Glu Glu Met Gly Gly Gly Pro Gly Ala Pro His Glu Gly Pro Leu His
277                  20                  25                  30
279 gcc ccg ccg ccg cct gcg ccg cac cag ccc ccc gcc gcc tcc cgc tcc     325
280 Ala Pro Pro Pro Pro Ala Pro His Gln Pro Pro Ala Ala Ser Arg Ser
281                  35                  40                  45
283 atg ttc gtg gcc ctc ctg ggg ctg ggg ctg ggc cag gtt gtc tgc agc     373
284 Met Phe Val Ala Leu Leu Gly Leu Gly Leu Gly Gln Val Val Cys Ser
285       50                  55                  60
287 gtc gcc ctg ttc ttc tat ttc aga gcg cag atg gat cct aat aga ata     421
288 Val Ala Leu Phe Phe Tyr Phe Arg Ala Gln Met Asp Pro Asn Arg Ile
289       65                  70                  75
291 tca gaa gat ggc act cac tgc att tat aga att ttg aga ctc cat gaa     469
292 Ser Glu Asp Gly Thr His Cys Ile Tyr Arg Ile Leu Arg Leu His Glu
293 80                  85                  90                  95
295 aat gca gat ttt caa gac aca act ctg gag agt caa gat aca aaa tta     517
296 Asn Ala Asp Phe Gln Asp Thr Thr Leu Glu Ser Gln Asp Thr Lys Leu
297                  100                 105                 110
299 ata cct gat tca tgt agg aga att aaa cag gcc ttt caa gga gct gtg     565
300 Ile Pro Asp Ser Cys Arg Arg Ile Lys Gln Ala Phe Gln Gly Ala Val
301             115                 120                 125
303 caa aag gaa tta caa cat atc gtt gga tca cag cac atc aga gca gag     613
304 Gln Lys Glu Leu Gln His Ile Val Gly Ser Gln His Ile Arg Ala Glu
```

```
305          130                    135                     140
307 aaa gcg atg gtg gat ggc tca tgg tta gat ctg gcc aag agg agc aag     661
308 Lys Ala Met Val Asp Gly Ser Trp Leu Asp Leu Ala Lys Arg Ser Lys
309      145                    150                     155
311 ctt gaa gct cag cct ttt gct cat ctc act att aat gcc acc gac atc     709
312 Leu Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Thr Asp Ile
313 160                    165                     170                     175
315 cca tct ggt tcc cat aaa gtg agt ctg tcc tct tgg tac cat gat cgg     757
316 Pro Ser Gly Ser His Lys Val Ser Leu Ser Ser Trp Tyr His Asp Arg
317                    180                    185                     190
319 ggt tgg gcc aag atc tcc aac atg act ttt agc aat gga aaa cta ata     805
320 Gly Trp Ala Lys Ile Ser Asn Met Thr Phe Ser Asn Gly Lys Leu Ile
321                    195                    200                     205
323 gtt aat cag gat ggc ttt tat tac ctg tat gcc aac att tgc ttt cga     853
324 Val Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg
325        210                    215                     220
327 cat cat gaa act tca gga gac cta gct aca gag tat ctt caa cta atg     901
328 His His Glu Thr Ser Gly Asp Leu Ala Thr Glu Tyr Leu Gln Leu Met
329      225                    230                     235
331 gtg tac gtc act aaa acc agc atc aaa atc cca agt tct cat acc ctg     949
332 Val Tyr Val Thr Lys Thr Ser Ile Lys Ile Pro Ser Ser His Thr Leu
333 240                    245                     250                     255
335 atg aaa gga gga agc acc aag tat tgg tca ggg aat tct gaa ttc cat     997
336 Met Lys Gly Gly Ser Thr Lys Tyr Trp Ser Gly Asn Ser Glu Phe His
337                    260                    265                     270
339 ttt tat tcc ata aac gtt ggt gga ttt ttt aag tta cgg tct gga gag     1045
340 Phe Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ser Gly Glu
341                    275                    280                     285
343 gaa atc agc atc gag gtc tcc aac ccc tcc tta ctg gat ccg gat cag     1093
344 Glu Ile Ser Ile Glu Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln
345      290                    295                     300
347 gat gca aca tac ttt ggg gct ttt aaa gtt cga gat ata gat     1135
348 Asp Ala Thr Tyr Phe Gly Ala Phe Lys Val Arg Asp Ile Asp
349      305                    310                     315
351 tgagccccag tttttggagt gttatgtatt tcctggatgt ttggaaacat tttttaaaac     1195
353 aagccaagaa agatgtatat aggtgtgtga gactactaag aggcatggcc ccaacggtac     1255
355 acgactcagt atccatgctc ttgaccttgt agagaacacg cgtatttaca gccagtggga     1315
357 gatgttagac tcatggtgtg ttacacaatg gttttaaat tttgtaatga attcctagaa     1375
359 ttaaaccaga ttggagcaat tacgggttga ccttatgaga aactgcatgt gggctatggg     1435
361 agggggttggt ccctggtcat gtgccccttc gcagctgaag tggagaggt gtcatctagc     1495
363 gcaattgaag gatcatctga agggcaaat tcttttgaat tgttacatca tgctggaacc     1555
365 tgcaaaaaat acttttctta atgaggagag aaaatatatg tattttata taatatctaa     1615
367 agttatattt cagatgtaat gttttctttg caaagtattg taaattatat ttgtgctata     1675
369 gtatttgatt caaatatttt aaaaatgtct tgctgttgac atatttaatg ttttaaatgt     1735
371 acagacatat ttaactggtg cactttgtaa attccctggg gaaaacttgc agctaaggag     1795
373 gggaaaaaaa tgttgtttcc taatatcaaa tgcagtatat ttcttcgttc tttttaagtt     1855
375 aatagatttt ttcagacttg tcaagcctgt gcaaaaaaat taaaatggat gccttgaata     1915
377 ataagcagga tgttggccac caggtgcctt tcaaatttag aaactaattg actttagaaa     1975
379 gctgacattg ccaaaaagga tacataatgg gccactgaaa tctgtcaaga gtagttatat     2035
```

VERIFICATION SUMMARY　　　　　　DATE: 09/22/2003
PATENT APPLICATION:　**US/09/721,212**　　TIME: 10:43:45

Input Set :　**A:\A-451K REV 091003-54.txt**
Output Set:　**N:\CRF4\09222003\I721212.raw**

```
L:36 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:1,Line#:33
L:264 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:3,Line#:261
L:967 M:258 W: Mandatory Feature missing, <223> Blank for SEQ#:42,Line#:964
```